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Feed Intake and Growth Performance of Native Ducks (*Anas platyrhynchos domesticus*) Fed Mung Bean (*Vigna radiata*) Sprouts

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In regions like the Philippines, where climatic unpredictability can substantially affect forage production, ensuring an efficient and reliable feed source is of utmost importance. This study investigates the utilization of Mung Bean (*Vigna radiata*) Sprout as a potential feed ingredient for native ducks (*Anas platyrhynchos domesticus*) and its effect on feed intake and growth performance. Although Mung Bean Sprout is not a traditional feed preservation strategy, it could help stabilize poultry nutrition. A total of twenty-five female ducks were randomly assigned to individual cages to prevent cross-contamination, adhering to strict hygiene practices. A Completely Randomized Design (CRD) was implemented with five treatments and five replicates. The treatments included various proportions of Mung Bean Sprout and commercial feed. While there were no significant differences ($p < 0.05$) in feed intake among treatments, ducks fed with 50% MBS + 50% commercial feed (T2) exhibited the highest growth rates and improved feed conversion efficiency compared to other treatments. These findings underscore the potential of Mung Bean Sprout as a valuable feed ingredient for improving the growth performance of native ducks, particularly in regions with volatile forage production due to climatic variability. This research sheds light on a promising avenue for sustainable poultry nutrition in the face of climate-related challenges.
Keywords: Food security, climate impact, dietary supplementation, feed efficiency, growth performance, carcass quality,

INTRODUCTION

Native duck farming plays a vital role in promoting food security and generating income in many rural communities, particularly in Southeast Asia. These ducks are well-adapted to local conditions, making them an essential component of sustainable farming systems. In the Philippines, native ducks comprise approximately 6–10% of the total poultry population, supporting smallholder farmers through egg and meat production (Philippine Statistics Authority, 2021). The industry contributes to local economies by supplying fresh duck products to wet markets, small-scale processors, and producers of traditional delicacies. However, ensuring optimal growth performance, carcass quality, and profitability in native duck production remains a challenge. One avenue being explored to address these challenges is the incorporation of Mung Bean Sprouts (MBS) into the duck's diet. MBS, known for their rich nutritional profile and local availability, have shown promise in improving growth rates and meat quality in poultry (Li *et al.* 2018). Mung Bean Sprouts (MBS), recognized for their rich nutritional content and local availability, have demonstrated potential in enhancing growth performance and meat quality in poultry" (Shea *et al.*, 2024). Given the potential benefits of MBS, it is essential to investigate their role in enhancing native duck farming practices and profitability.

According to Mensah and Olukoya (2007), mung bean (*Vigna radiata*), commonly known as *olaludi* among the Igbo people of Nigeria, is an underutilized legume with significant nutritional potential. It is rich in lysine, making it an excellent complement to cereals (Onwurafor *et al.*, 2014). The nutritional composition of mung bean includes 22.9% protein, 61.8% carbohydrates, 1.2% fat, 4.4% fiber, and 3.5% ash (Offia and Madubuike, 2014). Unlike many other legumes, mung bean causes minimal flatulence due to its easily digestible protein and carbohydrate content (Nair *et al.*, 2013). Regular consumption of mung beans and its sprouts helps maintain gut microbial balance and lowers the risks of toxic substance absorption, hypercholesterolemia, coronary heart disease, and cancer (Ganesan and Xu, 2018). In Eastern Nigeria, where it is widely cultivated, mung bean is consumed on its own or paired with yam, cocoyam, or *abacha*.

Mung bean (*Vigna radiata* (L.) Wilczek) is a valuable yet underutilized crop that can help dryland smallholder farmers

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improve farm sustainability and profitability. As a warm-season legume, it is highly nutritious, offering a rich source of protein, essential minerals, and vitamins. While mung bean is predominantly cultivated in Asia, it is also grown in parts of Africa and Australia. Currently, nearly 90% of global mung bean production is concentrated in Asia, with India, China, Pakistan, and Thailand among the leading producers (Lambrides and Godwin, 2007).

Integrating mung bean into cropping systems, particularly in Central and South Asia, enhances the sustainability of dryland agriculture by improving soil fertility and diversifying local farming practices. Its use as a catch crop provides farmers with an additional income source while contributing to sustainable land management. Given its agronomic and economic benefits, mung bean holds significant potential for strengthening food security and resilience in changing environmental conditions (Pataczek *et al.*, 2018).

In recent years, sustainability has become a central focus in agriculture, emphasizing the need for environmentally friendly and economically viable farming practices. Native duck farming systems, which are deeply embedded in many communities, are no exception. Addressing both productivity and sustainability in these systems requires the exploration of innovative dietary strategies. The increased use of underutilized plant resources can enhance food security and support sustainable agricultural practices by offering locally available, nutritionally rich alternatives (Ulian *et al*., 2020).

Evaluating the effects of mung bean sprout (MBS) supplementation on feed intake and growth performance is essential to optimizing native duck production systems.

MATERIALS AND METHODS

***Mung bean sprout (MBS) preparation and experimental treatment*:** To create the experimental ration, mung bean seeds underwent washing and an 8-hour soaking period before drainage. Mung bean incubation was conducted at room temperature for 3 days. During the germination process, watering occurred every 12 hours. Mung bean sprouts were subsequently chopped into 0.5-inch segments before being mixed with commercial feed or provided to the ducks in accordance with their assigned treatment. Ducks were randomly assigned to individual cages with the following treatments: T0: Control group, receiving 100% Commercial Feed (CF); T1: 25% Mung Bean Sprouts (MBS) + 75% Commercial Feed (CF); T2: 50% Mung Bean Sprouts (MBS) + 50% Commercial Feed (CF); T3: 75% Mung Bean Sprouts (MBS) + 25% Commercial Feed (CF); T4: 100% Mung Bean Sprouts (MBS). Each treatment consisted of five replications.

Growth performance assessment: Parameters such as weight gain, average daily gain (ADG), and feed conversion ratio (FCR) were meticulously recorded throughout the trial. These measurements provided valuable insights into how the varying levels of mung bean sprouts in their diet influenced their growth rates and efficiency of feed utilization. Additionally, the ducks' feed intake was closely monitored to assess their preferences and palatability of the different dietary treatments.

***Experimental animals and design*:** A total of twenty-five female native ducks (Anas platyrhynchos domesticus), aged 3 to 4 months with an initial body weight ranging from 0.8 to 2.0 kg, were randomly assigned to individual cages to prevent cross-contamination while adhering to strict hygiene practices. The ducks were fed a diet consisting of mung bean sprouts (MBS) and commercial feed (CF) in varying proportions based on the experimental treatments. The commercial feed (CF) used in this study was a commercially available grower ration, formulated to meet the nutritional requirements of growing ducks. The composition of the CF included approximately 18% crude protein, 5% crude fiber, 4% crude fat, and essential vitamins and minerals to support optimal growth and development. To maintain the integrity of data collection, these ducks were randomly assigned to individual cages, preventing any potential cross-contamination. Prior to the commencement of the study, meticulous cleaning and disinfection procedures were followed to ensure a hygienic environment for the ducks. All procedures were performed in accordance with standard animal welfare practices to ensure the humane treatment of the ducks throughout the study. The study was conducted from July 2022 to January 2023, including the preparation of the experimental area, sprouting of mung bean, and data collection, under controlled environmental conditions.

***Statistical analysis**:* Data collected from the growth performance assessment were analyzed using a one-way analysis of variance (ANOVA) to determine any significant differences among treatments. Tukey's Honestly Significant Difference (HSD) test was applied for post hoc analysis to identify specific differences between treatment groups. Statistical significance was set at $p < 0.05$. All statistical analyses were performed using the statistical software package SPSS.

***Limitations and Future Research*:** This study provides valuable insights into the utilization of mung bean (*Vigna radiata*) sprouts as a feed ingredient for native ducks (*Anas platyrhynchos domesticus*). However, certain limitations should be acknowledged. The study was conducted under controlled conditions, which may not fully represent varying farm environments. Additionally, factors such as long-term effects on duck health, meat and egg quality, and economic feasibility were not explored in depth.

Future research should investigate the optimal inclusion levels of mung bean sprouts in duck diets over extended periods, assess their impact on overall productivity and product quality, and evaluate their cost-effectiveness in commercial settings. Further studies on the nutritional composition of mung bean sprouts at different growth stages

could also provide valuable data for enhancing poultry nutrition strategies.

RESULTS AND DISCUSSION

The results of this study indicated that while there were no significant differences ($p > 0.05$) in feed intake among the treatments, certain levels of Mung Bean Sprout (MBS) inclusion in the diet led to slight improvements. The lack of significant differences in feed intake may be attributed to the palatability and digestibility of MBS, which did not drastically alter the ducks' feeding behavior. Additionally, since MBS is a highly digestible and nutrient-dense ingredient, ducks may have maintained a relatively stable feed intake across treatments while still meeting their nutritional requirements. Another possible reason is that native ducks exhibit adaptive feeding behaviors, allowing them to adjust to different dietary compositions without significantly altering overall consumption levels. This is in support to the study of Supartini *et al.* (2020), that the best production performance of the treatments was found at 1.8% germinated mung bean sprout and 1.2% acidifier additive based on the FCR (1.14±0.06) with DI at 91.94±1.11 g/head, ADG at 305.33±34.93 g/day, and final BW found after 30 days at 2,434.67±155.28 g.

Moreover, specific proportions of MBS in the diet significantly enhanced growth rates and feed conversion efficiency. Ducks in treatment T2 (50% MBS + 50% CF) exhibited the highest weight gain and average daily gain (ADG), followed by those in treatment T3 (75% MBS + 25% CF). Ducks in treatment T0 (100% CF) had the lowest growth performance. These findings highlight the potential benefits of incorporating Mung Bean Sprout into the diet of native ducks, particularly in regions with volatile forage production due to climatic variability.

The positive impact of Mung Bean Sprout supplementation on growth performance aligns with previous research in poultry nutrition. Mung bean sprouts (*Vigna radiata*), recognized for their rich nutritional profile and local availability, have demonstrated potential in enhancing growth rates and improving meat quality in poultry (Singh *et al.*, 2013). The improved growth rates observed in this study may be attributed to the enhanced nutrient composition of the MBS-supplemented diets. Additionally, MBS are known to possess certain bioactive compounds that could positively influence feed utilization and digestion in poultry (Chen, 2019).

Li *et al.* (2018) and Garcia *et al.* (2016) collectively reinforced the significance of Mung Bean Sprouts (MBS) as a beneficial dietary component for poultry nutrition. Karami *et al.* (2025) highlighted that mung beans contain bioactive compounds with hepatoprotective, antioxidant, and hypolipidemic properties, which may contribute to improved metabolic health and overall growth performance in poultry. Additionally, their rich protein and micronutrient content can support essential physiological functions, further enhancing their potential as a sustainable feed ingredient. Moreover, this highlight the inclusion of dietary fiber in MBS, which can promote gut health and enhance nutrient absorption, indirectly contributing to improved growth rates. Additionally, Garcia *et al.* (2016) described immunomodulatory properties of certain bioactive compounds in MBS, which can strengthen the poultry immune system, leading to reduced stress and better overall

Table 1. Cumulative feed intake (g) in fresh weight basis of ducks fed with varying levels of MBS.

Week	Varying levels of Mung bean Sprout					
	0	**1**	**2**	**3**	**4**	***P***
1	194.37±4.65	198.47±1.53	199.55±2.51	199.60±0.02	198.47±1.53	0.43
2	200.00±0.00	198.47±1.53	200.00±0.00	199.55±0.03	198.47±1.53	0.43
3	200.00±0.00	199.20±1.61	200.00±0.00	199.43±0.04	199.20±1.61	0.56
4	200.00±0.00	200.00±0.06	200.00±0.00	200.00±0.01	200.00±0.00	0.49
Total feed intake	794.37±2.44	796.14±0.63	999.50±0.18	977.69±4.26	796.14±0.63	0.07

0=control;1= 75% Commercial Feed+25% Mung bean Sprout;2=50% Commercial Feed+50% Mung bean Sprout;3=25% Commercial Feed+75% Mung bean Sprout;4= 100% Mung bean Sprout One-way Analysis of Variance; $p<0.05$=significant, $p>0.05$=not significant

Table 2. Total weight gain (TWG), average daily gain (ADG) and feed conversion ratio (FCR) of native duck fed with varying levels of Mung bean Sprout.

Parameters	Varying levels of Mung bean Sprout					
	0	**1**	**2**	**3**	**4**	***P***
TWG,g	733.00	1,044.00	1,181.00	1,142.00	780.00	0.70
ADG,g	101.24	140.72	169.01	149.04	111.42	0.03
FCR, DM	41.35	27.30	16.98	19.50	26.24	0.02

0=control;1= 75% Commercial Feed+25% Mung bean Sprout;2=50% Commercial Feed+50% Mung bean Sprout;3= 25% Commercial Feed+75% Mung bean Sprout;4=100% Mung bean Sprout One-way Analysis of Variance; $p<0.05$=significant, $p>0.05$=not significant

health. Also, Pujaningsih and Mangisah (2020) highlighted that mung bean sprout waste can be provided in the form of fresh or even fermented for the duck. According to its water activity, diet consist of mung bean sprout waste in the form of dried mash is recommended to be stored for a relatively longer period of time compare to the other treatments. These findings collectively support the notion that MBS supplementation can positively influence feed utilization, digestion, and immune response, ultimately resulting in enhanced growth performance in poultry.

***Conclusion*:** This study provides valuable insights into the potential of mung bean sprout (MBS) as a dietary supplement for native ducks, particularly in regions where climatic unpredictability affects forage production. While no significant differences in feed intake were observed, specific levels of MBS inclusion significantly improved growth performance and feed conversion efficiency. Ducks in treatment T2 (50% MBS + 50% CF) demonstrated the highest growth rates, suggesting this proportion as the optimal inclusion level for enhancing productivity.

The findings of this study have practical significance for native duck farmers, offering an alternative feed resource that can improve growth performance while reducing reliance on commercial feeds. The use of MBS as a supplementary feed ingredient may enhance farm sustainability, particularly in areas where feed costs fluctuate or forage availability is limited due to climate-related challenges.

***CRediT author statement*:** Mercury A. del Rosario and Sance J. Secondez conceived and designed the experiments, worked together the experiments, analyzed the data and wrote the paper, and reviewed the manuscript. All authors read and approved the manuscript.

***Ethical statement*:** The study adhered to the guidelines in R.A. 8485, the Animal Welfare Act of the Philippines.

***Availability of data and material*:** The data that supports the findings of this study are available from the corresponding author upon request.

***Consent for publication*:** All authors are giving the consent to publish this research article in JGIAS.

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***SDGs addressed*:** Zero hunger, No poverty, Responsible consumption and production, Climate action, and Life on land.

***Policy referred*:** Philippine Development Plan (PDP) 2023–2028, Department of Agriculture's National Livestock Program (NLP).

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